



RIC 2010 Spent Fuel Pool Criticality Analysis Regulatory Path Forward

Kent Wood
Office of Nuclear Reactor Regulation
Reactor Systems Branch
March 11, 2010

1



Introduction

- Significant increase in spent fuel pool (SFP) criticality Licensee Amendment Requests (LAR) over past four (4) years
 - 27 SFP LARs submitted
 - Expecting 5 this calendar year
 - Prior to that (back to 2000) no more than two a year
- Significant increase in complexity of SFP criticality analysis for reasons discussed later

2



What are the Requirements?

- 10CFR70.24
 - Monitor/Detect/Mitigation/Recovery
 - Emergency Plan/Drills
- 10CFR50 Appendix A GDC
 - 61: Fuel Storage & Handling and Radioactivity Control
 - 62: Prevention of Criticality in Fuel Storage & Handling
- 10CFR50.68
 - No Boron; keff < 0.95 at 95/95
 - Boron: keff < 1.0. w/o at 95/95; keff < 0.95 at 95/95 w/
- 10CFR50.36
 - Design Features
 - Limiting Conditions for Operation

3



State of the POOL

- Reduced Margins
 - More Complex Analyses Required
 - More Complex Storage Configurations
 - Material Degradation
 - Lack of a Holistic Approach
- Low Quality Submittals
- New Requirements/Challenges

4



It isn't your Grandparent's SFP

- Increased SFP capacity due to re-rack
- Increased fuel enrichments
- Increased use of burnable absorbers
- New fuel assembly designs
- New fuel assembly materials
- Burnup credit
- Soluble Boron credit
- Deterioration of installed neutron absorbers
- Increased storage configuration complexity
- Operating Parameters
- Future Changes

5



NRR's Path Forward

- NRR is preparing new guidance on
 - First establish Technical Basis
 - Develop new guidance
 - Retire OLD guidance (Kopp Letter, etc.)
- NRR Industry Engagement
 - Participate in industry forums
 - NRC workshops
 - Nuclear Criticality Safety training
- Coordinating with other NRC offices (NMSS, RES & NRO)
- Working with other stakeholders (ORNL, NEI, and others)

6



What Licensees Can Do Today

- Review recent submittals, Requests for Additional Information responses, and Safety Evaluations from other licensee LARs
- Review recent problems that have occurred at SFPs that have resulted in enforcement actions
- Recognize that margins have decreased requiring more analyses with less engineering judgment
- Take a holistic approach
- Come in for pre-submittal meetings
- Improve quality

7



Summary

- Each SFP Criticality Analysis is SFP Specific
- Margins have decreased challenging the status quo
- New guidance is currently being developed
- Come talk to us

8
